

What Is Claimed Is

1. An ellipsometer measurement apparatus for determining the thickness of a film applied on a substrate, having a light source (3) emitting an incoming beam (9), a transmitting optical system conveying the polarized incoming beam (9) to an incidence point (P) on the substrate, and a receiving optical system that has an analyzer (5.4) and conveys the reflected beam (10) formed at the incidence point (P) to a photodetector device (5.7, 5.8), the polarization direction of the incoming beam (9) and of the analyzer (5.4) being modified in time relative to one another, and the intensity changes produced thereby being evaluated by way of an evaluation device (7) in order to determine the film thickness, characterized in that

an angle measurement device (5.7, 5.8, 7.1) is provided with which the angle ([beta]) of the reflected beam (10) relative to a tangential plane of the substrate (1) at the incidence point (P) can be sensed; and that

the film thickness can be determined by way of the evaluation device (7) as a function of the angle ([beta]) that is sensed.
2. The measurement apparatus as defined in Claim 1, characterized in that the angle measurement device has a photodetector unit (5.7, 5.8) that is position-sensitive in the X and/or Y direction, as well as an evaluation stage with which the angle of reflection ([beta]) can be calculated from the position data and from distance data.
3. The measurement apparatus as defined in Claim 2, characterized in that the intensity changes and the position of the reflected beam (10) are sensed with the same photodetector (5.7) of the photodetector device.

4. The measurement apparatus as defined in Claim 2 or 3, characterized in that the photodetector device has two position-sensitive photodetectors (5.7, 5.8) arranged at different distances from the incidence point (P) in the beam path of the reflected beam (10); and that
the angle (β) is calculated on the basis of the differing positions of the reflected beam (10) on the two photodetectors (5.7, 5.8).
5. The measurement apparatus as defined in Claim 4, characterized in that a beam splitter (5.9) is arranged in the beam path of the reflected beam (10) in front of the two photodetectors (5.7, 5.8); and that
each photodetector (5.7, 5.8) receives a partial beam of the reflected beam (10).
6. The measurement apparatus as defined in one of Claims 1 through 3, characterized in that a converging lens (5.6) is arranged in front of the photodetector device (5.7).
7. The measurement apparatus as defined in one of the foregoing claims, characterized in that the transmitting optical system and the receiving optical system are integrated into a common carrier; and that
the carrier has a three-point support for placement on the film.
8. The measurement apparatus as defined in one of the foregoing claims, characterized in that the transmitting optical system has a polarizer (5.2) and a $\lambda/4$ plate in the beam path of the incoming beam (9); and that
the polarizer (5.2) or the analyzer (5.4) is arranged in rotationally drivable fashion about an axis normal to its surface.

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